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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/581,878	09/11/2000	Tadahiro Ohmi	FUK-71	7595

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EXAMINER

ALEJANDRO MULERO, LUZ L

ART UNIT	PAPER NUMBER
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1763

9

DATE MAILED: 04/01/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/581,878

Applicant(s)

OHMI ET AL.

Examiner

Luz L. Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 September 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Specification

The abstract of the disclosure is objected to because it exceeds 150 words in length. Correction is required. See MPEP § 608.01(b).

The disclosure is objected to because of the following informalities: at page 13-line 1, seems that the word -- field -- has been misspelled.

Appropriate correction is required.

Claim Objections

Claim 2 is objected to because of the following informalities: at lines 5 and 8, "are" and "a", respectively, should be deleted for proper grammar. Appropriate correction is required.

Claims 5 and 11 are objected to because of the following informalities: at line 3, the word -- through -- has been misspelled. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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In claim 1-line 6, the phrase "at least one substrate stage" renders the scope of the claim unclear because it is not certain whether applicant is referring to "a substrate stage" from claim 1-line 4 or another stage. Clarification is required.

In claim 1-line 9, the phrase "the gap" lacks antecedent basis.

In claim 1-lines 9-10, it is unclear how the gap between the cylinder and the vacuum vessel is made variable since it appears that the gap between the cylinder and the vacuum vessel plate should remain constant. Clarification is requested.

In claim 1-lines 12-13, the phrase "per one said cylinder" renders the scope of the claim unclear because only one cylinder was previously mentioned.

In claim 1-lines 13-14, the phrase "a space inside said cylinder" renders the claim vague and indefinite because it is not clear whether the space being referenced is the space inside the cylinder or the space which the cylinder surrounds. Clarification is required.

In claim 2-lines 12-13, the phrase "and at a position where said gap becomes minimum" renders the claim indefinite because it appears that the gap between the cylinder and the vacuum vessel top plate should remain constant. Clarification is required.

In claim 2-lines 13-14, the phrase "a plurality of cylinder lifting/lowering mechanisms per one said cylinder" renders the claim vague and indefinite because it is unclear whether there are a plurality of mechanisms for each cylinder or a plurality of mechanisms wherein each cylinder comprises one mechanism. Clarification is required.

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In claim 2-line 16, the phrase "a space inside said cylinder" renders the scope of the claim unclear because it appears that this should actually be the space between the cylinder and the plate. Clarification is required.

In claim 2-lines 17-18, the phrase "processing said substrate surface with said O ring" renders the scope of the claim unclear because it is not clear if the O-ring is used for processing the substrate surface. Clarification is required.

In claim 2-line 19, the use of the word "creating" appears to be improper because the transport chamber should already be present. Alternative language is requested.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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Claims 1-4, 6-10, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al., U.S. Patent 5,580,420 in view of Takahashi, U.S. Patent 5,314,574.

Watanabe et al. shows the invention substantially as claimed including a semiconductor manufacturing apparatus for processing a substrate surface (see col. 1, lines 6-14), the apparatus comprising: a vacuum vessel 6 having a top plate 3, 66; a bottom plate 31 in which a substrate stage provided (see figs. 1 and 4); two cylinders 15 installed surrounding the substrate stage (see col. 10, lines 28-35, and figs. 1 and 4); a gap between the cylinders and the top vacuum vessel plate is made variable by lifting/lowering the cylinder (see col. 7, lines 20-22); the cylinders having a lifting/lowering mechanism 36 (see col. 10, lines 28-35, and figs. 1 and 4) in order to separate a space which the cylinder surrounds comprising a processing chamber 6 from the a space outside the cylinder including a transport chamber 32 for transferring the substrate and provided with a substrate conveyer mechanism 10, 101 for transferring the substrate between the processing chamber and the transport chamber through the gap (see col. 6-line 63 to col. 7-line 25); the processing chamber is provided with a processing chamber gas inlet and a gas outlet (see col. 9, lines 55-62).

Watanabe et al. does not expressly disclose that the transport chamber is provided with a gas inlet and a gas outlet, that the cylinders are provided with an O-ring, and that the cylinders are connected to the bottom plate through bellows. Takahashi discloses an apparatus in which the transfer chamber comprises a gas inlet for supplying nitrogen gas and a gas outlet connected to an exhaust system in order to set

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a vacuum atmosphere (see col. 5, lines 24-36 and fig. 8). Therefore, in view of this disclosure it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Watanabe et al. as to further comprise a gas inlet and a gas outlet in the transfer chamber in order to set a vacuum atmosphere.

Furthermore, Takahashi discloses the use of O-rings 21 for tightly seal the chamber and the use of bellows 22 connected to the bottom plate 23 for freely expansion and compression of the cylinders lifting/lowering mechanism (see col. 4, lines 27-53). Therefore, in view of these disclosures it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus disclosed by Watanabe et al. as to further comprise the claimed O-ring and bellows in order to optimize the apparatus by tightly sealing the chamber and by freely expanding and compressing the lifting/lowering mechanism.

With respect to claims 3 and 8, note that the apparatus of Watanabe et al. shows a vacuum vessel 1 which can be divided, by cylinders 15, into a part including a processing chamber 6 and a part having a substrate transport mechanism 32 (see figs. 1 and 4). Furthermore, with respect to claims 4, 6-7 and 9-10, the Watanabe et al. reference further discloses that the apparatus comprises a microwave plasma generation mechanism for generating plasma in the processing chamber, magnetic field generating means 651-653 disposed substantially on the circumference surrounding the chamber in the atmosphere outside of the vacuum vessel, and radio frequency power

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source 610 provided to the substrate stage (see the abstract, col. 1-line 65 to col. 2-line 10, col. 9, line 24-62, and figs. 1 and 4).

Watanabe et al. does not expressly disclose that the magnetic field generating means are permanent magnets but it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Watanabe et al. as to comprise permanent magnets as the magnetic field generation means because permanent magnets are known in the art to be suitable means for generating a magnetic field and therefore their use in the apparatus of Watanabe et al. would be prima facie obvious in absence of evidence of unexpected results.

Claims 5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al., U.S. Patent 5,580,420 in view of Takahashi, U.S. Patent 5,314,574. as applied to claims 1-4 and 6-10 above, and further in view of Masahiro et al., JP 10-177994.

Watanabe et al. and Takahashi do not expressly disclose that the plasma generation mechanism radiates microwave through a slot antenna. Masahiro et al. discloses a plasma treating device utilizing a microwave plasma generating device comprising a slot antenna 202 to perform uniform plasma treatment (see abstract). Therefore, in view of this disclosure, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Watanabe et al. as to comprise a microwave plasma generation mechanism which comprises a

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slot antenna in order to optimize the apparatus by performing uniform plasma treatments with high reproducibility since the microwave can be radiated stably.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 703-305-4545. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 703-308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



Luz L. Alejandro
Patent Examiner
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March 25, 2002